

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Harvey et al.

Application No. Unassigned

Art Unit: Unassigned

Examiner: Unassigned

Filed: January 4, 2002

For: A PAPER WEB WITH PRE-
FLOCCULATED FILLER
INCORPORATED THEREIN

PENDING CLAIMS AS AMENDED

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14. A paper web prepared by a process comprising the steps of:
providing a pulp slurry, said slurry containing at least about 30% by dry pulp weight of a low-grade pulp, said low-grade pulp being a pulp selected from the group consisting of a groundwood pulp, a recycled pulp, and mixtures thereof;
adding a pre-flocculated filler to said slurry;
forming a paper web from said slurry; and
winding said web on a reel;
said pre-flocculated filler being added to said slurry in an amount effective to provide a filler content in said web, at least a portion of said filler in said web comprising said pre-flocculated filler.

15. The paper web according to claim 14, the process further comprising the steps of:
drying said web; and
cutting said web into sheets.

16. The paper web according to claim 15, the process further comprising the step of:
printing on said web prior to cutting said web into sheets.

17. A newspaper prepared by a process comprising the steps of:
providing a newsprint pulp slurry;
adding a pre-flocculated filler to said slurry;

forming a paper web from said slurry, said pre-flocculated filler being added to said slurry in an amount effective to provide a filler content in said web, at least a portion of said filler in said web comprising said pre-flocculated filler;

collecting said web on a reel, and in either order:

printing on said web; and

cutting said web into sheets.

18. The newspaper according to claim 17, wherein said web is cut into sheets after said step of printing on said web.

32. A paper web prepared by a process comprising the steps of:

providing a pulp slurry, said slurry containing at least about 30% dry pulp weight of a low-grade pulp, said low-grade pulp being a pulp selected from the group consisting of a groundwood pulp, a recycled pulp, and mixtures thereof;

adding a pre-flocculated filler to said slurry to thereby form a slurry/filler mixture;

introducing said slurry/filler mixture to the headbox of a paper-making machine;

depositing said slurry on a web-former; and

withdrawing a paper web from said headbox;

said pre-flocculated filler being added to said slurry in an amount effective to provide a filler content in said web, at least a portion of said filler in said web comprising said pre-flocculated filler.

33. The paper web according to claim 32, the process further comprising the steps of:

drying said web; and

cutting said web into sheets.

34. The paper web according to claim 33, the process further comprising the step of: printing on said web prior to cutting said web into sheets.

41. A paper web prepared by a process comprising the steps of:

providing a treated slurry of coated broke, said treated slurry having been prepared by a process comprising the steps of:

providing a repulped slurry of coated broke, said slurry containing fibers and particles of coating residue;

adding a chemical flocculant to said slurry in an amount effective to form floccs of said fibers and particles of coating residue; and

applying a shearing force to said slurry, said sheering force being sufficient to limit the size of said floccs to a size that is effective to enhance the retention of said floccs in a paper web; and

withdrawing a paper web from said treated slurry.

48. A paper web prepared by a process comprising the steps of:
providing a treated slurry of coated broke, said treated slurry having been prepared by a process comprising the steps of:

providing a repulped slurry of coated broke, said slurry containing fibers and particles of coating residue;

adding a chemical flocculant to said slurry in an amount effective to form floccs of said fibers and particles of coating residue; and

applying a shearing force to said slurry, said sheering force being sufficient to limit the size of said floccs to a size that is effective to enhance the retention of said floccs in a paper web;

adding said treated slurry to a fibrous pulp slurry to form a combined slurry; and
withdrawing a paper web from said combined slurry.

55. A paper web prepared by a process comprising the steps of:
providing a treated slurry of coated broke, said treated slurry having been prepared by a process comprising the steps of:

continuously introducing a repulped slurry of coated broke and a chemical flocculant into a shear imparting device, said slurry containing fibers and particles of coating residue and said chemical flocculant being added in an amount effective to form floccs of said fibers and said particles of coating residue; and

continuously withdrawing from said shear imparting device a slurry containing said floccs, the shearing force imparted by said device being sufficient to limit the size of said floccs to a size that is effective to enhance the retention of said floccs in a paper web; and

withdrawing a paper web from said slurry.

62. A paper web prepared by a process comprising the steps of:
providing a treated slurry, said treated slurry having been prepared by a process comprising the steps of:

continuously introducing a repulped slurry of coated broke and a chemical flocculant into a shear imparting device, said slurry containing fibers and particles of coating residue and said chemical flocculant being added in an amount effective to form flocs of said fibers and said particles of coating residue; and

continuously withdrawing from said shear imparting device a slurry containing said flocs, the shearing force imparted by said device being sufficient to limit the size of said flocs to a size that is effective to enhance the retention of said flocs in a paper web; and

adding said treated slurry to a fibrous pulp slurry to form a combined slurry; and withdrawing a paper web from said combined slurry.

63. The paper web according to claim 14, wherein said low-grade pulp is present in said slurry in an amount of at least about 40%.

64. The paper web according to claim 14, wherein said low-grade pulp is present in said slurry in an amount of at least about 50%.

65. The paper web according to claim 14, wherein said pre-flocculated filler is selected from the group consisting of clays, lithopone, sulfate fillers, titanium pigments, talc, calcium carbonate, and gypsum.

66. The paper web according to claim 65, wherein said pre-flocculated filler is flocculated with a flocculating agent selected from the group consisting of cationic starch derivatives and anionic starch derivatives.

67. The paper web according to claim 66, wherein said pre-flocculated filler is flocculated with a cationic starch paste.

68. The paper web according to claim 65, wherein said pre-flocculated filler is prepared by a process comprising the steps of:

continuously introducing an aqueous slurry of a non-flocculated paper filler material and an aqueous slurry of from 0.5 to 60% by weight of the filler material of a flocculating agent into a shear imparting device and imparting to the mixture within said device a shearing force sufficient to provide flocculated filler particles of a size adapted for use in paper making without any additional treatment and continuously removing said flocculated filler particles from the shear imparting device.

69. The paper web according to claim 14, wherein said pulp includes groundwood pulp.

70. The paper web according to claim 14, wherein said pre-flocculated filler is added to said slurry in an amount effective to provide a total filler content in said web of at least about 5% by weight.

71. The paper web according to claim 14, wherein said pre-flocculated filler is added to said slurry in an amount effective to provide a total filler content in said web of at least about 7.5% by weight.

72. The paper web according to claim 14, wherein all of the filler incorporated into said web is present as a result of said addition of said pre-flocculated filler to said slurry.

73. The paper web according to claim 14, wherein the amount of flocculating agent in said filler ranges from about 0.5% to about 4% dry flocculant by dry weight of said filler.

74. The paper web according to claim 32, wherein said low-grade pulp is present in said slurry in an amount of at least about 40%.

75. The paper web according to claim 32, wherein said low-grade pulp is present in said slurry in an amount of at least about 50%.

76. The paper web according to claim 32, wherein said pre-flocculated filler is selected from the group consisting of clays, lithopone, sulfate fillers, titanium pigments, talc, calcium carbonate, and gypsum.

77. The paper web according to claim 76, wherein said pre-flocculated filler is flocculated with a flocculating agent selected from the group consisting of cationic starch derivatives and anionic starch derivatives.

78. The paper web according to claim 77, wherein said pre-flocculated filler is flocculated with a cationic starch paste.

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79. The paper web according to claim 76, wherein said pre-flocculated filler is prepared by a process comprising the steps of:

continuously introducing an aqueous slurry of a non-flocculated paper filler material and an aqueous slurry of from 0.5 to 60% by weight of the filler material of a flocculating agent into a shear imparting device and imparting to the mixture within said device a shearing force sufficient to provide flocculated filler particles of a size adapted for use in paper making without any additional treatment and continuously removing said flocculated filler particles from the shear imparting device.

80. The paper web according to claim 32, wherein said pulp includes groundwood pulp.

81. The paper web according to claim 32, wherein said pre-flocculated filler is added to said slurry in an amount effective to provide a total filler content in said web of at least about 5% by weight.

82. The paper web according to claim 32, wherein said pre-flocculated filler is added to said slurry in an amount effective to provide a total filler content in said web of at least about 7.5% by weight.

83. The paper web according to claim 32, wherein all of the filler incorporated into said web is present as a result of said addition of said pre-flocculated filler to said slurry.

84. The paper web according to claim 32, wherein the amount of flocculating agent in said filler ranges from about 0.5% to about 4% dry flocculant by dry weight of said filler.

85. The paper web according to claim 48, wherein said shearing force ranges from about 2800 to about 9200 s⁻¹.

86. The paper web according to claim 48, wherein said flocculant is selected from the group consisting of water soluble vinyl polymers, gums, polyacryamide, polyDADMAC, aluminum sulfate, mannogalactanes, and charged starch derivatives.

87. The paper web according to claim 48, wherein said chemical flocculant is added in an amount ranging from about 0.05% to about 60% by weight of broke material in said slurry.

88. The paper web according to claim 48, wherein said chemical flocculant is added in an amount ranging from about 5% to about 15% by weight of broke material in said slurry.

89. The paper web according to claim 48, wherein said treated slurry is added in an amount ranging from 5% to 25% of said fibrous pulp slurry.

90. The paper web according to claim 62, wherein said shearing force ranges from about 2800 to about 9200 s^{-1} .

91. The paper web according to claim 62, wherein said flocculant is selected from the group consisting of water soluble vinyl polymers, gums, polyacryamide, polyDADMAC, aluminum sulfate, mannogalactanes, and charged starch derivatives.

92. The paper web according to claim 62, wherein said chemical flocculant is added in an amount ranging from about 0.05% to about 60% by weight of broke material in said slurry.

93. The paper web according to claim 62, wherein said chemical flocculant is added in an amount ranging from about 5% to about 15% by weight of broke material in said slurry.

94. The paper web according to claim 62, wherein said treated slurry is added in an amount ranging from 5% to 25% of said fibrous pulp slurry.